

Package: smoothy (via r-universe)

October 25, 2024

Type Package

Title Automatic Estimation of the Most Likely Drug Combination using Smooth Algorithm

Version 1.0.0

Description A flexible moving average algorithm for modeling drug exposure in pharmacoepidemiology studies as presented in the article: Ouchi, D., Giner-Soriano, M., Gómez-Lumbreras, A., Vedia Urgell, C., Torres, F., & Morros, R. (2022). "Automatic Estimation of the Most Likely Drug Combination in Electronic Health Records Using the Smooth Algorithm : Development and Validation Study." JMIR medical informatics, 10(11), e37976. [doi:10.2196/37976](https://doi.org/10.2196/37976).

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Encoding UTF-8

RoxygenNote 7.2.3

Depends R (>= 4.3)

Imports dplyr, tidyr (>= 1.3.0), zoo (>= 1.8), stringr

LazyData true

Suggests knitr, rmarkdown, ggplot2, gridExtra

VignetteBuilder knitr

NeedsCompilation no

Author Dan Ouchi [aut, cre, cph]
(<https://orcid.org/0000-0002-8630-152X>), Alvaro Franquet
[aut] (<https://orcid.org/0000-0003-1976-3641>)

Maintainer Dan Ouchi <dan.ouchi.vernet@gmail.com>

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drugtreatment	<i>Drug Administration Data</i>
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Description

This dataset contains information about drug administration. Each row represents a unique drug administration event.

Usage

```
drugtreatment
```

Format

A data frame with the following columns:

id Unique identifier for each drug administration event.

start_date The start date of drug administration.

end_date The end date of drug administration.

drug The name of the drug administered.

Examples

```
data("drugtreatment")
head(drugtreatment)
```

smooth_algorithm *Apply Smooth Algorithm in a Dataset*

Description

Description part

Usage

```
smooth_algorithm(id, treatment, day, N, width = 61)
```

Arguments

id	Unique identifier of the patient.
treatment	Name of the drug used.
day	Day of the treatment.
N	Number of drugs used in the treatment.
width	An integer specifying the window width (in numbers of days, 61 by default).

Value

A data.frame with the following structure:

id A character vector representing the unique identifier for each patient.

day A character vector representing the date when the treatment was administered to the patients.

treatment A character vector representing the type of treatment given to each patient.

smoothed_treatment A character vector representing the smoothed treatment given to each patient.

Examples

```
library(smoothy)
library(dplyr)

data(drugstreatment)

df <- drugstreatment |>
  filter(id == "01f13c15-d9f1-4106-a04f-976c457edd0a")

structured_df <- smooth_parse(
  id = df$id,
  start_date = df$start_date,
  end_date = df$end_date,
  drug = df$drug,
  study_from = "1970-01-01",
  study_to = "1975-01-01"
)
```

```

head(structured_df)

id = structured_df$id
treatment = structured_df$treatment
day = structured_df$day
N = structured_df$N
width = 61

smoothed <- smooth_algorithm(id = id, treatment = treatment, day = day, N = N, width = width)
head(smoothed)

```

smooth_deparse	<i>Deparse</i>
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Description

Transforms the Data with a Row by Date to a Row by Individual.

Usage

```
smooth_deparse(id, day, treatment)
```

Arguments

<code>id</code>	Unique identifier of the patient.
<code>day</code>	Day of the treatment.
<code>treatment</code>	A character vector representing the type of treatment given to each patient.

Value

A data.frame with the following structure:

id A character vector representing the unique identifier for each patient.

start_date Start date of the treatment.

end_date End date of the treatment.

treatment A character vector representing the type of treatment given to each patient.

Examples

```

library(smoothy)
library(dplyr)

data(drugstreatment)

my_data <- filter(drugstreatment, id == "01f13c15-d9f1-4106-a04f-976c457edd0a")

```

```

structured_df <- smooth_parse(
  id = my_data$id,
  start_date = my_data$start_date,
  end_date = my_data$end_date,
  drug = my_data$drug,
  study_from = "1970-01-01",
  study_to = "1975-01-01"
)

head(structured_df)

id = structured_df$id
treatment = structured_df$treatment
day = structured_df$day
N = structured_df$N
width = 61

smoothed <- smooth_algorithm(id = id, treatment = treatment, day = day, N = N, width = width)

head(smoothed)

deparsed_treatment <- smooth_deparse(smoothed$id, smoothed$day, smoothed$treatment)
deparsed_smoothed <- smooth_deparse(smoothed$id, smoothed$day, smoothed$smoothed_treatment)

```

smooth_diff

Compute the Difference Between Initial and Smoothed Treatment

Description

This function computes the differences between the initial treatment and the treatment when it's smoothed.

Usage

```
smooth_diff(treatment, smoothed_treatment)
```

Arguments

treatment a character vector containing the original treatment data..

smoothed_treatment a character vector containing the smoothed treatment return by `smooth_algorithm` function.

Value

A data.frame with three columns: `diff_type`, `diff`, `change` and `treatment`:

type A character vector representing indicating the type of difference computed.

days_changed The number of different items.

proportion_of_change The proportion of difference computed as number of different rows over number of rows.

treatment A character vector representing the type of treatment given to each patient.

Examples

```
library(smoothy)
library(dplyr)

data(drugstreatment)

my_data <- filter(drugstreatment, id == "01f13c15-d9f1-4106-a04f-976c457edd0a")

structured_df <- smooth_parse(
  id = my_data$id,
  start_date = my_data$start_date,
  end_date = my_data$end_date,
  drug = my_data$drug,
  study_from = "1970-01-01",
  study_to = "1975-01-01"
)

head(structured_df)

id = structured_df$id
treatment = structured_df$treatment
day = structured_df$day
N = structured_df$N
width = 61

smoothed <- smooth_algorithm(id = id, treatment = treatment, day = day, N = N, width = width)

head(smoothed)

smooth_diff(treatment = smoothed$treatment, smoothed_treatment = smoothed$smoothed_treatment)
```

smooth_parse

Transform Data to be Used in smooth_algorithm() Function

Description

This function transforms the data to obtain the daily treatment.

Usage

```
smooth_parse(
  id,
```

```
    start_date,  
    end_date,  
    drug,  
    study_from = min(start_date),  
    study_to = max(end_date)  
  )
```

Arguments

<code>id</code>	Unique identifier of the patient.
<code>start_date</code>	Start date of the treatment.
<code>end_date</code>	End date of the treatment.
<code>drug</code>	Name of the drug used.
<code>study_from</code>	A date indicating when the study start.
<code>study_to</code>	A date indicating when the study finish.

Value

A data.frame with the following structure:

id Unique identifier of the patient.

drug Name of the drug used.

day Day of the treatment.

N Number of drugs used in the treatment

Examples

```
library(smoothy)  
library(dplyr)  
  
data(drugstreatment)  
  
df <- drugstreatment |>  
  filter(id == "01f13c15-d9f1-4106-a04f-976c457edd0a")  
  
structured_df <- smooth_parse(  
  id = df$id,  
  start_date = df$start_date,  
  end_date = df$end_date,  
  drug = df$drug,  
  study_from = "1970-01-01",  
  study_to = "1975-01-01"  
)  
  
head(structured_df)
```

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